

REMARKS

Favorable reconsideration of this application is respectfully requested in view of the claim amendments and following remarks. By virtue of the amendment, claims 1-7, 11-27, and 31-49 are pending in the present application of which claims 1, 18, 41, and 46 are independent and claims 38-49 are newly added.

Claims 1-6, 8, 11-23, 25, and 31-37 were rejected under 35 U.S.C. § 102(a) as being anticipated by Iwasaki et al. (EP 1 117 118 A1). Claim 1-5, 8, 11-22, 25-27, and 31-37 were rejected under 35 U.S.C. § 102(b) as being anticipated by Yoshikawa et al. (EP 0 878 819 A2). Claims 1-3, 8-20, and 28-37 were rejected under 35 U.S.C. § 102(b) as being anticipated by Kaneko et al. (EP 0 367 195 A2). Claims 7 and 24 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Iwasaki et al. in view of Dalton et al. (3,717,790). These rejections are respectfully traversed for at least the reasons set forth below.

Personal Interview Conducted

The Applicants wish to thank Examiner Leurig and Examiner Patel for granting the personal interview conducted on May 19, 2004. During the interview, the 102 rejections applying Iwasaki et al., Yoshikawa et al., and Kaneko et al. were discussed. It was generally agreed that Yoshikawa et al. fails to teach the at least one protrusion of the electron supply structure, but Examiner Leurig needed to further review Yoshikawa et al. It was also agreed that the cited references do not teach the hourglass shape of an insulator layer shown in figures 3A-B of the Applicants' invention, and that the cited references do not teach the rounded protrusion of the electron supply structure shown in figures 1-6 of the Applicants' invention.

Claim Rejections Under 35 U.S.C. §102

The test for determining if a reference anticipates a claim, for purposes of a rejection under 35 U.S.C. § 102, is whether the reference discloses all the elements of the claimed combination, or the mechanical equivalents thereof functioning in substantially the same way to produce substantially the same results. As noted by the Court of Appeals for the Federal Circuit in *Lindemann Maschinenfabrick GmbH v. American Hoist and Derrick Co.*, 221 USPQ 481, 485 (Fed. Cir. 1984), in evaluating the sufficiency of an anticipation rejection under 35 U.S.C. § 102, the Court stated:

Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim.

Therefore, if the cited reference does not disclose each and every element of the claimed invention, then the cited reference fails to anticipate the claimed invention and, thus, the claimed invention is distinguishable over the cited reference.

Claims 1-6, 8, 11-23, 25, and 31-37 were rejected under 35 U.S.C. § 102(a) as being anticipated by Iwasaki et al. Claim 1-5, 8, 11-22, 25-27, and 31-37 were rejected under 35 U.S.C. § 102(b) as being anticipated by Yoshikawa et al. Claims 1-3, 8-20, and 28-37 were rejected under 35 U.S.C. § 102(b) as being anticipated by Kaneko et al.

Regarding the rejection applying Yoshikawa et al., figure 1 of Yoshikawa et al. discloses an electron emission device including an electron supply layer 12 and an insulator 13. As shown in figure 1, the electron supply layer 12 does not include at least one protrusion, which was agreed upon in the personal interview. Accordingly, Yoshikawa et al. fails to teach all the features of claims 1-5, 8, 11-22, 25-27, and 31-37.

Regarding the rejections applying Iwasaki et al. and Kaneko et al., claim 1 recites,

an insulator formed above said electron supply structure and said at least one protrusion, wherein the insulator includes at least one protrusion that substantially conforms to the at least one protrusion of the electron supply structure.

Neither Iwasaki et al. nor Kaneko et al. teach or suggest these features. The rejection applying Iwasaki et al. refers to figure 22. Figure 22 shows a reversed-tapered block 21b, which was interpreted by the Examiner as the claimed protrusion of the electron supply structure. The block 21b includes an insulator 13a. However, the insulator 13a does not include at least one protrusion.

The rejection applying Kaneko et al. refers to figure 11. Figure 11 shows an insulating layer 21 and an insulating layer 22. None of the insulating layers include a protrusion. Accordingly, neither Iwasaki et al. nor Kaneko et al. teach all the features of claim 1.

Claim 18 has been amended to include the features of dependent claims 28 and 30. Claim 18 now recites,

forming an insulator on said electron supply structure and said at least one protrusion, such that said insulator is relatively thinner near said at least one protrusion compared to a flat region of said electron supply structure and said insulator has an hourglass shape local to said at least one protrusion.

Neither Iwasaki et al. nor Kaneko et al. teach or suggest the claimed hourglass shape of the insulator local to the protrusion. Support for the claimed hourglass shape is shown in figures 3A-B of the Applicants' invention. Figure 11 of Kaneko et al. illustrates an insulating

layer 21, but the insulating layer 21 does not include an hourglass shape. Figure 11 also shows a second, separate insulating layer 22 in the form of a thin film. However, the insulating layer 22 is also not in an hourglass shape. Thus, Kaneko et al. fails to teach forming an insulator having an hourglass shape. Even if the separate and distinct layers 21 and 22, which are formed in two separate steps as described in column 19 of Kaneko et al., are somehow construed as a single insulating layer, the layers 21 and 22 still do not have an hourglass shape (e.g., see the hourglass shape in figures 3A-B of the Applicants' invention). Accordingly, neither Iwasaki et al. nor Kaneko et al. teach all the features of claim 18. Thus, claims 1-7, 11-27, and 31-42 are believed to be allowable.

Claim Rejections Under 35 U.S.C. §103

Claims 7 and 24 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Iwasaki et al. in view of Dalton et al. Neither Iwasaki et al. nor Dalton et al. teach or suggest a doping level of a doped semiconductor for an electron emitter supply layer varying in a depth direction. According, claims 7 and 24 are believed to be allowable.

Newly Added Claims

Claims 38-49 are newly added. Claims 38 and 39 are dependent on independent claim 18 and are believed to be allowable for at least the same reasons claim 18 is believed to be allowable. In addition claim 38 recites an hourglass shape that is substantially symmetrical along a horizontal axis. Claim 39 recites at least one rounded protrusion. As agreed upon in the interview, none of these features are taught or suggested by the prior art.

Claims 40-42 are dependent on claim 1 and thus are also believed to be allowable. In addition claim 40 recites the protrusion of the insulator extends upwards from flat regions of the insulator. Claim 41 recites wherein the insulator has substantially the same thickness at the at least one protrusion of the insulator and at the flat regions. Claim 42 recites wherein the at least one protrusion of the electron supply structure is rounded. None of these features are taught by the prior art.

Independent claim 43 recites the hourglass shape of the insulator, and independent claim 46 recites the insulator includes at least one protrusion that substantially conforms to the at least one protrusion of the electron supply structure. None of these features are taught by the prior art, and thus claims 43-49 are believed to be allowable.

PATENT

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Conclusion

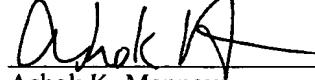
In light of the foregoing, withdrawal of the rejections of record and allowance of this application are earnestly solicited. Should the Examiner believe that a telephone conference with the undersigned would assist in resolving any issues pertaining to the allowability of the above-identified application, please contact the undersigned at the telephone number listed below. Please grant any required extensions of time and charge any fees due in connection with this request to deposit account no. 08-2025.

Respectfully submitted,

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By


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